

REMARKS

This amendment is being filed in response to the Office Action dated December 4, 2002 for the above-referenced patent application. Claims 1-32 are pending in the application. Claims 2 and 4 have been canceled.

Claim 1 has been amended to incorporate the limitations of independent claims 2 and 4. These limitations are supported by the specification, therefore, no new matter has been added (*see* Specification, page 4, lines 19-26; page 7, lines 20-24).

The Claim Rejections Under 35 U.S.C. § 102 Should Be Withdrawn

Claims 1, 15, 17-24, 27-29 31-32 have been rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent 5,402,641 (Katoh et al.). The Examiner alleges that Katoh et al. discloses a means for controlling the temperature of the absorption layer that includes changing the air/fuel ratio.

Claim 1 is amended to provide that the support is arranged to be electrically heated. However, Katoh et al. does not disclose the active control of the temperature of the NOx absorber. Katoh et al. does describes the connection between a minimal temperature and an effective regeneration of the absorber. The temperature change of the absorber is merely an indirect result of the normal function of the internal combustion engine. This is specifically, this is shown in the seventh embodiment of the Katoh et al. invention where the absorber is first SOx poisoned during a period of relatively low temperature and high oxygen concentration. It is

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then possible to release the sulfur component from the absorber with a temperature only slightly higher than the temperature at which the absorber was SOx poisoned. As a result, the absorber can be poisoned at a relatively low temperature, by setting the reference temperature to a relatively low temperature, so that the sulfur component is released by the indirect heating of the absorber. Therefore, by lowering the reference temperature the temperature of the absorber is not directly changed to a higher value (see Katoh et al., Col. 10, line 56-68; col. 11, lines 1-28, and Figure 14).

Katoh et al. stands in marked contrast to the present invention, which solves the NOx regeneration and SOx problem in a completely novel way. Specifically, the temperature of the absorber is actively controlled by using a metallic support member. The temperature of the metallic support member is then actively changed by adjusting the parameters of the exhaust gas and/or using an electric heating element to cause the absorption layer to be heated to a temperature of at least 500° during regeneration. Therefore, in view of the foregoing, reconsideration and withdrawal of the rejection of Claims 1, 15, 17-24, 27-29 31-32 as being anticipated by U.S. Patent 5,402,641 (Katoh et al.) is respectfully requested.

The Claim Rejections Under 35 U.S.C. § 103 Should Be Withdrawn

Claims 2-11, 16 and 25-27 have been rejected under 35 U.S.C. §103(a) as obvious in view of U.S. Patent 5,402,641 (Katoh et al.) further in view of U.S. Patent 5,240,682 (Cornelison et al.). However, for the reasons stated above, amended independent Claim 1 of the present invention is not obvious in view of Katoh et al.

further in view of Cornelison et al. Since Claims 2-11, 16 and 25-27 are dependent on
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Claim 1 they are also not obvious. Therefore, in view of the foregoing, reconsideration and withdrawal of the rejection of Claims 2-11, 16 and 25-27 as obvious in view of U.S. Patent 5,402,641 (Katoh et al.) further in view of U.S. Patent 5,240,682 (Cornelison et al.) is respectfully requested.

Claims 12-14, 30 have been rejected under 35 U.S.C. §103(a) as obvious in view of U.S. Patent 5,402,641 (Katoh et al.) further in view of U.S. Patent 4,755,499 (Neal et al.). However, for the reasons stated above, amended independent Claim 1 of the present invention is not obvious in view of Katoh et al. further in view of Neal et al. Since Claims 12-14, 30 are dependent on Claim 1 they are also not obvious. Therefore, in view of the foregoing, reconsideration and withdrawal of the rejection of Claims 12-14, 30 as obvious in view of U.S. Patent 5,402,641 (Katoh et al.) further in view of U.S. Patent 4,755,499 (Neal et al.) is respectfully requested.

Claims 1, 15, 17-24, 27-29 and 31-32 have been rejected under 35 U.S.C. §103(a) as obvious in view of U.S. Patent 5,404,719 (Araki et al.) further in view of U.S. Patent 5,402,641 (Katoh et al.). As argued in the amendment dated September 12, 2002, Araki discloses an arrangement for controlling the temperature of a NO_x during normal operation. Such control is for the purpose of maintaining the desired operating temperature within a selected range during the absorption portion of the operating cycle. In contrast to Araki, the invention of claim 1 provides for control of the temperature of the absorber during the regeneration phase of operation when the engine is operated with a rich mixture for regenerating the absorber. As claimed, the control unit is arranged to control the temperature of the absorber "by at least one

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adjusting composition parameters of the exhaust gas and by application of an electric current to heat said support member to cause the absorption layer to be heated for a temperature of at least 500°C during said regeneration." Further, for the reasons stated above in connection with the Katoh reference, pending independent Claim 1 of the present invention is not obvious in view of Araki et al. further in view of Katoh et al. Since Claims 15, 17-24, 27-29 and 31-32 are dependent on Claim 1 they are also not obvious. Therefore, in view of the foregoing, reconsideration and withdrawal of the rejection of Claims 1, 15, 17-24, 27-29 and 31-32 as obvious in view of U.S. Patent 5,404,719 (Araki et al.) further in view of U.S. Patent 5,402,641 (Katoh et al.) is respectfully requested.

Claims 2-11, 16 and 25-27 have been rejected under 35 U.S.C. §103(a) as obvious in view of U.S. Patent 5,404,719 (Araki et al.) further in view of U.S. Patent 5,402,641 (Katoh et al.). Again, for the reasons stated above, amended independent Claim 1 of the present invention is not obvious in view of Araki et al. further in view of Katoh et al. Since Claims 2-11, 16 and 25-27 are dependent on Claim 1 they are also not obvious. Therefore, in view of the foregoing, reconsideration and withdrawal of the rejection of Claims 2-11, 16 and 25-27 as obvious in view of U.S. Patent 5,404,719 (Araki et al.) further in view of U.S. Patent 5,402,641 (Katoh et al.) is respectfully requested.

Claims 12-14, 30 have been rejected under 35 U.S.C. §103(a) as obvious in view of U.S. Patent 5,404,719 (Araki et al.) further in view of U.S. Patent 5,402,641 (Katoh et al.). However, for the reasons stated above, amended

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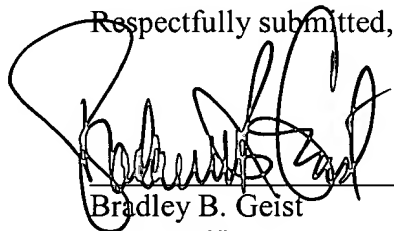
independent Claim 1 of the present invention is not obvious in view of Araki et al. further in view of Katoh et al. Since Claims 12-14, 30 are dependent on Claim 1 they are also not obvious. Therefore, in view of the foregoing, reconsideration and withdrawal of the rejection of Claims 12-14, 30 as obvious in view of U.S. Patent 5,404,719 (Araki et al.) further in view of U.S. Patent 5,402,641 (Katoh et al.) is respectfully requested.

In view of the foregoing amendments and remarks, reconsideration and allowance of all claims is respectfully requested.

Attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment. The attached page is captioned "Version with markings to show changes made".

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Respectfully submitted,



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VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS

Please cancel claims 2 and 4.

Please amend claim 1 as follows:

----1. (Four times Amended) An internal combustion engine arrangement comprising:

- a spark-ignited internal combustion engine having a controllable air/fuel ratio;
- an exhaust line receiving exhaust gas from the internal combustion engine;
- an oxide gas absorber in the exhaust line including a support member wherein the support member is a metal support member arranged to be heated by an electric current; and an absorption layer on a surface of the support member having a total surface area which is larger than that of the underlying area of the support member accessible to exhaust gas flowing through the exhaust line for reversible absorption of at least one nitrogen oxide (NO_x) and at least one oxide of sulfur (SO_x); and,
- a control unit for controlling regeneration of said oxide gas absorber, said control unit being arranged to periodically change said controllable air/fuel ratio of said engine to a rich mixture to regenerate said absorber and said control unit being arranged to control the temperature of the absorption layer by at least one of adjusting composition parameters of the exhaust gas and by application of an electric current to

heat said support member to cause the absorption layer to be heated to a temperature of at least 500°C during said regeneration for desorbing absorbed NO_x or SO_x.--